IN THE CLAIMS:

The claims have not been amended and are presented here for the Examiner's convenience.

Claims 1 – 4 (cancelled).

5. (original) An optical disk recording apparatus, comprising:

a measuring circuit which measures a parameter of a time-base error of a pulse train, the measuring circuit comprising:

a phase-locked loop including a phase comparator and a variable frequency oscillator, wherein the phase comparator compares phases of an inputted pulse train and a clock signal based on an oscillation output of the variable frequency oscillator to output a phase error signal, and wherein an oscillation frequency of the variable frequency oscillator is variably controlled in correspondence with the phase error signal so as to allow the clock signal to be synchronized with the pulse train;

an absolute value circuit which determines absolute values of phase errors consecutively outputted from the phase comparator; and

an average value circuit which determines an average value of the absolute values of the phase errors which are consecutively determined, or which determines a value corresponding to the average value,

wherein the value determined by the average value circuit is outputted as a measured value of a parameter of a time-base error of the pulse train;

a beam-power adjusting circuit which adjusts recording beam power of a laser beam; and

a control circuit which controls such that test recording is effected with respect to

an optical disk while consecutively varying the recording beam power of the laser beam prior to the recording of the optical disk, the test recording is reproduced after the test recording, a value of the parameter of the time-base error of the reproduced pulse train is measured by the measuring circuit, an appropriate value of the recording beam power of the laser beam during actual recording is determined on the basis of the measured value, and the recording beam power of the laser beam is set to the appropriate value so as to effect actual recording.

6. (original) The optical disk recording apparatus according to claim 5, further comprising:

a pulse-train reproducing circuit which reproduces a pulse train corresponding to a recording laser-beam drive signal from a return-light reception signal of the recording laser beam,

wherein, during actual recording, the control circuit controls such that the value of the parameter of the time-base error of the pulse train reproduced by the pulse-train reproducing circuit is measured by the measuring circuit, and the recording beam power of the laser beam is consecutively corrected to an appropriate value in real time on the basis of the measure value.

7. (original) The optical disk recording apparatus according to claim 5, wherein the average value circuit determines an average value of the absolute values of the phase errors at all edges of the pulse train, or determines a value corresponding to the average value.

8. (original) The optical disk recording apparatus according to claim 5, wherein the average value circuit includes an accumulator which consecutively accumulates the

absolute values of the phase errors, and which determines an accumulated value within a predetermined time duration as the value corresponding to the average value of the absolute values of the phase errors.

9. (original) The optical disk recording apparatus according to claim 7, wherein the average value circuit includes an accumulator which consecutively accumulates the absolute values of the phase errors, and which determines an accumulated value within a predetermined time duration as the value corresponding to the average value of the absolute values of the phase errors.

Claims 10 and 11 (cancelled).

12. (previously presented) A measuring circuit which measures a parameter of the time-base error of a pulse train, the measuring circuit comprising:

a phase-locked loop including a phase comparator and a variable frequency oscillator, wherein the phase comparator compares phases of an inputted pulse train and a clock signal based on an oscillation output of the variable frequency oscillator to output a phase error signal, and wherein an oscillation frequency of the variable frequency oscillator is variably controlled in correspondence with the phase error signal so as to allow the clock signal to be synchronized with the pulse train; and

an average value circuit which determines an average value of phase errors consecutively outputted from the phase comparator, or which determines a value corresponding to the average value,

wherein the value determined by the average value circuit is outputted as a measured value of the parameter of the time-base error of the pulse train, and the pulse train has a signal representing digital information on the basis of its pulse length,

and the measuring circuit further includes:

a pulse-length discriminating circuit which discriminates a pulse length of one of a pit-corresponding pulse and a blank-corresponding pulse of the pulse train,

wherein the average value circuit determines the average value of the phase error at one of a leading edge and a trailing edge of the pit-corresponding pulse, or determines a value corresponding to the average value.

13. (original) The measuring circuit according to claim 12, wherein the average value circuit includes an accumulator which consecutively accumulates the phase errors, and which determines an accumulated value within a predetermined time duration as the value corresponding to the average value of the phase errors.

14. (previously presented) A measuring circuit which measures a parameter of the time-base error of a pulse train, the measuring circuit comprising:

a phase-locked loop including a phase comparator and a variable frequency oscillator, wherein the phase comparator compares phases of an inputted pulse train and a clock signal based on an oscillation output of the variable frequency oscillator to output a phase error signal, and wherein an oscillation frequency of the variable frequency oscillator is variably controlled in correspondence with the phase error signal so as to allow the clock signal to be synchronized with the pulse train; and

an average value circuit which determines an average value of phase errors consecutively outputted from the phase comparator, or which determines a value corresponding to the average value,

wherein the value determined by the average value circuit is outputted as a measured value of the parameter of the time-base error of the pulse train and the pulse

train has a signal representing digital information on the basis of its pulse length, and the measuring circuit further includes:

a pulse-length discriminating circuit which discriminates a pulse length of one of a pit-corresponding pulse and a blank-corresponding pulse of the pulse train,

wherein the average value circuit determines the average value of the phase error at one of a leading edge and a trailing edge of the blank-corresponding pulse, or determines a value corresponding to the average value.

15. (original) The measuring circuit according to claim 14, wherein the average value circuit includes an accumulator which consecutively accumulates the phase errors, and which determines an accumulated value within a predetermined time duration as the value corresponding to the average value of the phase errors.

16. (original) An optical disk recording apparatus, comprising:

a measuring circuit which measures a parameter of the time-base error of a pulse train, the measuring circuit comprising:

a phase-locked loop including a phase comparator and a variable frequency oscillator, wherein the phase comparator compares phases of an inputted pulse train and a clock signal based on an oscillation output of the variable frequency oscillator to output a phase error signal, and wherein an oscillation frequency of the variable frequency oscillator is variably controlled in correspondence with the phase error signal so as to allow the clock signal to be synchronized with the pulse train; and

an average value circuit which determines an average value of phase errors consecutively outputted from the phase comparator, or which determines a value corresponding to the average value,

wherein the value determined by the average value circuit is outputted as a measured value of the parameter of the time-base error of the pulse train;

a time-base correcting circuit which corrects a time base of a recording laser-beam drive signal; and

a control circuit which controls such that an amount of time-base correction of the recording laser-beam drive signal is set to a predetermined tentative value prior to recording of an optical disk, test recording is effected with respect to the optical disk while consecutively varying the recording beam power of the laser beam, the test recording is reproduced after the test recording, a value of the parameter of the time-base error of the reproduced pulse train is measured by the measuring circuit with respect to the test recording recorded with appropriate beam power, the amount of time-base correction of the recording laser-beam drive signal during actual recording is determined on the basis of the measured value, and the amount of time-base correction of the recording laser-beam drive signal is set to the value so as to effect actual recording.

17. (original) The optical disk recording apparatus according to claim 16, wherein the average value circuit includes an accumulator which consecutively accumulates the phase errors, and which determines an accumulated value within a predetermined time duration as the value corresponding to the average value of the phase errors.

18. (original) An optical disk recording apparatus, comprising:

a measuring circuit which measures a parameter of the time-base error of a pulse train, the measuring circuit comprising:

a phase-locked loop including a phase comparator and a variable frequency oscillator, wherein the phase comparator compares phases of an inputted pulse train and a clock signal based on an oscillation output of the variable frequency oscillator to output a phase error signal, and wherein an oscillation frequency of the variable frequency oscillator is variably controlled in correspondence with the phase error signal so as to allow the clock signal to be synchronized with the pulse train; and

an average value circuit which determines an average value of phase errors consecutively outputted from the phase comparator, or which determines a value corresponding to the average value,

wherein the value determined by the average value circuit is outputted as a measured value of the parameter of the time-base error of the pulse train, and

wherein the pulse train has a signal representing digital information on the basis of its pulse length, and the measuring circuit further comprises:

a pulse-length discriminating circuit which discriminates a pulse length of one of a pit-corresponding pulse and a blank-corresponding pulse of the pulse train,

wherein the average value circuit determines the average value of the phase error at one of a leading edge and a trailing edge of the pit-corresponding pulse, or determines a value corresponding to the average value;

a time-base correcting circuit which corrects a time base of a recording laser-beam drive signal; and

a control circuit which controls such that an amount of time-base correction of the recording laser-beam drive signal is set to a predetermined tentative value prior to recording of an optical disk, test recording is effected with respect to the optical disk while consecutively varying the recording beam power of the laser beam, the test recording is reproduced after the test recording, values of the parameter of the time-base error of the reproduced pulse train are measured for respective pulse lengths by the measuring circuit with respect to the test recording recorded with appropriate beam power, the amounts of time-base correction of the recording laser-beam drive signal during actual recording are determined for the respective pulse lengths on the basis of the measured values of the parameter of the time-base error, and the amounts of time-base correction of relevant portions of the recording laser-beam drive signal are respectively set to those values so as to effect actual recording.

19. (original) The optical disk recording apparatus according to claim 18, wherein the average value circuit includes an accumulator which consecutively accumulates the phase errors, and which determines an accumulated value within a predetermined time duration as the value corresponding to the average value of the phase errors.

20. (original) An optical disk recording apparatus, comprising:

a measuring circuit which measures a parameter of the time-base error of a pulse train, the measuring circuit comprising:

a phase-locked loop including a phase comparator and a variable frequency oscillator, wherein the phase comparator compares phases of an inputted pulse train and a clock signal based on an oscillation output of the variable frequency oscillator to

output a phase error signal, and wherein an oscillation frequency of the variable frequency oscillator is variably controlled in correspondence with the phase error signal so as to allow the clock signal to be synchronized with the pulse train; and

an average value circuit which determines an average value of phase errors consecutively outputted from the phase comparator, or which determines a value corresponding to the average value,

wherein the value determined by the average value circuit is outputted as a measured value of the parameter of the time-base error of the pulse train, and

wherein the pulse train has a signal representing digital information on the basis of its pulse length, and the measuring circuit further comprises:

a pulse-length discriminating circuit which discriminates a pulse length of one of a pit-corresponding pulse and a blank-corresponding pulse of the pulse train,

wherein the average value circuit determines the average value of the phase error at one of a leading edge and a trailing edge of the blank-corresponding pulse, or determines a value corresponding to the average value;

a time-base correcting circuit which corrects a time base of a recording laser-beam drive signal; and

a control circuit which controls such that an amount of time-base correction of the recording laser-beam drive signal is set to a predetermined tentative value prior to recording of an optical disk, test recording is effected with respect to the optical disk while consecutively varying the recording beam power of the laser beam, the test recording is reproduced after the test recording, values of the parameter of the time-base error of the reproduced pulse train are measured for respective pulse lengths by

the measuring circuit with respect to the test recording recorded with appropriate beam power, the amounts of time-base correction of the recording laser-beam drive signal during actual recording are determined for the respective pulse lengths on the basis of the measured values of the parameter of the time-base error, and the amounts of time-base correction of relevant portions of the recording laser-beam drive signal are respectively set to those values so as to effect actual recording.

21. (original) The optical disk recording apparatus according to claim 20, wherein the average value circuit includes an accumulator which consecutively accumulates the phase errors, and which determines an accumulated value within a predetermined time duration as the value corresponding to the average value of the phase errors.

22. (original) A measuring circuit which measures a parameter of a time-base error of a pulse train, the measuring circuit comprising:

a phase-locked loop including a phase comparator and a variable frequency oscillator, wherein the phase comparator compares phases of an inputted pulse train and a clock signal based on an oscillation output of the variable frequency oscillator to output a phase error signal, and wherein an oscillation frequency of the variable frequency oscillator is variably controlled in correspondence with the phase error signal so as to allow the clock signal to be synchronized with the pulse train;

an absolute value circuit which determines absolute values of phase errors consecutively outputted from the phase comparator;

a first average value circuit which determines an average value of the absolute values of the phase errors which are consecutively determined, or which determines a

value corresponding to the average value; and

a second average value circuit which determines an average value of phase errors consecutively outputted from the phase comparator, or which determines a value corresponding to the average value,

wherein the values determined by the first average value circuit and the second average value circuit are respectively outputted as measured values of first and second parameters of the time-base error of the pulse train.

23. (original) An optical disk recording apparatus, comprising:

a measuring circuit which measures a parameter of a time-base error of a pulse train, the measuring circuit comprising:

a phase-locked loop including a phase comparator and a variable frequency oscillator, wherein the phase comparator compares phases of an inputted pulse train and a clock signal based on an oscillation output of the variable frequency oscillator to output a phase error signal, and wherein an oscillation frequency of the variable frequency oscillator is variably controlled in correspondence with the phase error signal so as to allow the clock signal to be synchronized with the pulse train;

an absolute value circuit which determines absolute values of phase errors consecutively outputted from the phase comparator;

a first average value circuit which determines an average value of the absolute values of the phase errors which are consecutively determined, or which determines a value corresponding to the average value; and

a second average value circuit which determines an average value of phase errors consecutively outputted from the phase comparator, or which determines a value

corresponding to the average value,

wherein the values determined by the first average value circuit and the second average value circuit are respectively outputted as measured values of first and second parameters of the time-base error of the pulse train;

a beam-power adjusting circuit which adjusts recording beam power of a laser beam;

a time-base correcting circuit which corrects time base of a recording laser-beam drive signal; and

a control circuit which controls such that an amount of time-base correction of the recording laser-beam drive signal is set to a predetermined tentative value prior to recording of an optical disk, test recording is effected with respect to the optical disk while consecutively varying the recording beam power of the laser beam, the test recording is reproduced after the test recording, a value of the first parameter of the time-base error of the reproduced pulse train is measured by the measuring circuit, an appropriate value of the recording beam power of the laser beam during actual recording is determined on the basis of the measured value, a value of the second parameter of the time-base error of the reproduced pulse train is measured by the measuring circuit with respect to the test recording recorded with appropriate beam power, the amount of time-base correction of the recording laser-beam drive signal during actual recording is determined on the basis of the measured value, the recording beam power of the laser beam is set to the appropriate value, and the amount of time-base correction of the recording laser-beam drive signal is set to the value so as to effect actual recording.

Claims 24 and 25 (cancelled)

26. (original) A measuring circuit for measuring a parameter of a time-base error of a pulse train, the measuring circuit comprising:

a phase-locked loop including:

variable frequency oscillating means, and

phase comparing means for comparing phases of an inputted pulse train and a clock signal based on an oscillation output of the variable frequency oscillating means to output a phase error signal,

wherein an oscillation frequency of the variable frequency oscillating means is variably controlled in correspondence with the phase error signal so as to allow the clock signal to be synchronized with the pulse train;

absolute value determining means for determining absolute values of phase errors consecutively outputted from the phase comparing means;

first average value determining means for determining an average value of the absolute values of the phase errors which are consecutively determined, or determining a value corresponding to the average value; and

second average value determining means for determining an average value of phase errors consecutively outputted from the phase comparing means, or determining a value corresponding to the average value,

wherein the values determined by the first average value determining means and the second average value determining means are respectively outputted as measured values of first and second parameters of the time-base error of the pulse train.

27. (previously presented) A measurement circuit which measures a value of a

time base error of pulses in a pulse train, the measurement circuit comprising:

a switching circuit which selectively supplies one of a pulse train shaped from a return-light reception signal of a reading laser-beam during reproducing and a pulse-train shaped form from a return-light reception signal of a recording laser-beam during recording;

a phase-locked loop including a phase comparator and a variable frequency oscillator, wherein the phase comparator receives the pulse train from the switching circuit and a clock signal and outputs a phase error signal corresponding to a phase difference between the pulse train and the clock signal, and wherein the variable frequency oscillator outputs the clock signal to the phase comparator and variably controls the frequency of the clock signal based on the phase error signal so as to allow the clock signal to be synchronized with the pulse train;

an absolute value circuit which determines absolute values of the phase error signal consecutively output from the phase comparator; and

an average value circuit which determines an average value of the absolute values of the phase error signal which is consecutively determined, or which determines a value corresponding to the average value,

wherein the value determined by the average value circuit is output as a measured value of a time-base error of the pulse train.

28. (previously presented) The measurement circuit according to claim 27, wherein the pulse train shaped from the return-light reception signal of the reading laser-beam during reproducing is an EFM signal.

29. (previously presented) The measurement circuit according to claim 27,

wherein the switching circuit having a pulse-train reproducing circuit generates a WEFM signal, as the pulse train shaped from the return-light reception signal of the laser beam, by comparing the return-light signal with a predetermined reference signal.